WHAT IS CLAIMED IS:

1. A communication network comprising:

two duplicated substantially identical switch fabrics, including a first switch fabric comprising a first N x M crossbar switch and a second switch fabric comprising a substantially identical second N x M crossbar switch, wherein N is the number of ingress ports and M is the number of egress ports of each respective N x M crossbar switch;

wherein said first and second crossbar switches are connected in substantially identical parallel data paths, such that each ingress port of said first and said second crossbar switch is interconnected with a data launching module, and each egress port of said first and said second crossbar switch is interconnected with a data receiving module; and

wherein the geometry of said switch fabrics is folded, such that a data launching module and a data receiving module occupy the same physical circuit card.

2. The communication network of claim 1 wherein N is equal to M.

3. The communication network of claim 1 wherein N is not equal to M.

4. The communication network of claim 2 wherein N is greater than 10.

5. The communication network of claim 4 wherein N is greater than 40.

6 The communication network of claim 5 wherein N is greater than 60.

7. The communication network of claim 3 wherein N and M are each greater than 10.

8. The communication network of claim 7 wherein N and M are each greater than 40.

9. The communication network of claim 8 wherein N and M are each greater than 60.

10. The communication network of claim 1 wherein said crossbar switches are optical switches.

11. The communication network of claim 10 wherein said optical switches are interconnected with said data launching and said data receiving modules through optical fibers.

12. The communication network of claim 1 wherein each of said crossbar switches is configured to pass information at a data rate of approximately 12.5 gigabits per second.

13. The communication network of claim 1 wherein said data launching module and said data receiving module are internal optics modules.

14. The communication network of claim 1 wherein said data launching module is interconnected with an ingress data forwarding module, and said data receiving module is interconnected with an egress data forwarding module.

15. The communication network of claim 14 wherein said ingress data forwarding module and said egress data forwarding module are packet forwarding modules.

16. The communication network of claim 1 further comprising a router system, said router system incorporating said first and said second switch fabrics.

17. A communication network comprising:

two duplicated substantially identical switch fabrics, including a first switch fabric comprising a first N x M optical crossbar switch and a second switch fabric comprising a substantially identical second N x M optical crossbar switch, wherein N is the number of ingress ports and M is the number of egress ports of each respective N x M crossbar switch;

wherein said first and second optical crossbar switches are connected in substantially identical parallel data paths, such that each ingress port of said first and said second optical crossbar switch is interconnected with a data launching module, and each egress port of said first and said second optical crossbar switch is interconnected with a data receiving module; and

wherein each of said first and said second optical crossbar switches is configured to pass information at a data rate of approximately 12.5 gigabits per second.

18. The communication network of claim 17 wherein the geometry of said switch fabrics is folded, such that a data launching module and a data receiving module occupy the same physical circuit card.

19. The communication network of claim 17 wherein N is equal to M.

20. The communication network of claim 17 wherein N is not equal to M.

21. The communication network of claim 19 wherein N is greater than 10.

22. The communication network of claim 21 wherein N is greater than 40.

23. The communication network of claim 22 wherein N is greater than 60.

24. The communication network of claim 20 wherein N and M are each greater than 10.

25. The communication network of claim 24 wherein N and M are each greater than 40.

26. The communication network of claim 25 wherein N and M are each greater than 60.

27. The communication network of claim 17 wherein said optical crossbar switches are interconnected with said data launching modules and said data receiving modules through optical fibers.

28. The communication network of claim 17 wherein said data launching module and said data receiving module are internal optics modules.

29. The communication network of claim 17 wherein said data launching module is interconnected with an ingress data forwarding module, and said data receiving module is interconnected with an egress data forwarding module.

30. The communication network of claim 29 wherein said ingress data forwarding module and said egress data forwarding module are packet forwarding modules.

31. The communication network of claim 17 further comprising a router system, said router system incorporating said first and said second switch fabrics.

32. A method of switch fabric protection comprising:

simultaneously launching parallel duplicate data streams through two duplicated substantially identical switch fabrics, including launching a first data stream through a first switch fabric comprising a first N x M crossbar switch, and launching a substantially identical second data stream through a second switch fabric comprising a substantially identical second N x M crossbar switch, wherein N is the number of ingress ports and M is the number of egress ports of each respective N x M crossbar switch;

receiving said parallel duplicate data streams after passing simultaneously through said first and said second switch fabric;

examining said received duplicate data streams in accordance with predetermined selection criteria;

if either of said duplicate data streams satisfies said criteria and the other said duplicate data stream does not satisfy said criteria, then selecting said duplicate data stream that satisfies said criteria and discarding said duplicate data stream that does not satisfy said criteria; and

if both of said duplicate data streams satisfy said criteria, then arbitrarily selecting one of said duplicate data streams and arbitrarily discarding the non-selected duplicate data stream.

33. The method of claim 32 wherein said duplicate data streams comprise duplicate sequences of data structures, wherein said data structure is selected from the group consisting of data packets and substantially fixed size data chunks.

34. The method of claim 33 wherein said data structures are encapsulated before said launching with a code selected from the group consisting of forward error correction code and cyclic redundancy code.

35. The method of claim 34 wherein said selecting of said data stream is performed on a structure-by-structure basis in accordance with said code encapsulated with said data structure.

36. The method of claim 35 wherein said encapsulated code is stripped away from said data structure after said selecting.

37. The method of claim 32 wherein data delivery by said data streams is not interrupted by an occurrence selected from the group consisting of malfunction, failure, removal, and replacement of one of said two duplicated substantially identical switch fabrics.

38. The method of claim 32 wherein said examining is performed at an egress internal optics module interconnected with an egress port of each of said duplicated substantially identical switch fabrics

39. The method of claim 38 wherein said selecting and said discarding are performed at an egress packet forwarding module interconnected with said egress internal optics module.

40. The method of claim 36 wherein said encapsulated code is stripped away at an egress internal optics module.

41. The method of claim 34 wherein said data structures are encapsulated at an ingress internal optics module.

42. The method of claim 32 wherein N is equal to M.

43. The method of claim 32 wherein N is not equal to M.

44. The method of claim 42 wherein N is greater than 10.

45. The method of claim 44 wherein N is greater than 40.

46. The method of claim 45 wherein N is greater than 60.

47. The method of claim 43 wherein N and M are each greater than 10.

48. The method of claim 47 wherein N and M are each greater than 40.

49. The method of claim 48 wherein N and M are each greater than 60.

50. The method of claim 32 wherein said crossbar switches are optical switches.

51. The method of claim 32 wherein each of said crossbar switches passes information at a data rate of approximately 12.5 gigabits per second.

52. The method of claim 32 wherein said first and said second switch fabric are incorporated into a router system.

53. The method of claim 38 wherein said egress internal optics module is interconnected with said egress port through an optical fiber.

54. The method of claim 41 wherein said ingress internal optics module is interconnected with said ingress port through an optical fiber.

55. The method of claim 35 wherein said forward error correction corrects errors in said data structures.

56. The method of claim 35 wherein said forward error correction detects uncorrectable errors in said data structures.

57. A method of fault isolation and diagnostics in a switch fabric comprising:

launching a non-traffic-bearing data structure on a predetermined data path through said switch fabric from a first module interconnected with said switch fabric;

detecting and receiving said non-traffic-bearing data structure at a predetermined second module interconnected with said switch fabric;

examining said received non-traffic-bearing data structure in accordance with predetermined criteria;

if said non-traffic-bearing data structure satisfies said criteria, then determining that said predetermined data path is error-free; and

if said non-traffic-bearing data structure fails to satisfy said criteria, then determining that said predetermined data path is faulty.

58. The method of claim 57 wherein said switch fabric comprises multiple duplicated switch fabrics.

59. The method of claim 57 wherein said first module is selected from the group consisting of optical switch modules and internal optics modules.

60. The method of claim 57 wherein said second module is selected from the group consisting of optical switch modules and internal optics modules.

61. The method of claim 57 wherein said first module and said second module are the same module.

62. The method of claim 57 wherein said predetermined criteria comprise forward error correction.

63. The method of claim 57 wherein said switch fabric comprises an optical crossbar switch.

64. The method of claim 57 wherein said predetermined data path comprises an optical fiber cable.

65. The method of claim 57 wherein said non-traffic-bearing data structure is a substantially fixed size diagnostic chunk.

66. The method of claim 65 wherein identifications representing physical identities of said respective first module and of said second module are encoded into said diagnostic chunk prior to said launching; and

said predetermined criteria comprise coincidence between the physical identities of said respective first and second modules and said respective encoded identifications of said first and second modules.

67. The method of claim 57 wherein said switch fabric, said first module, and said second module are incorporated within a router system.